**CASE STUDY SUMMARY**

The Comerica building was retrofitted with energy-efficient lighting and an enhanced energy information system.

- Participant: Macanan Investments
- Building Type: Large office building
- Site Size: 213,500 ft²/ 700 occupants
- Project Cost: $358,000
- Project Incentives: $78,539
- Primary Benefit: Access to energy and demand data

# Enhanced automation allows Macanan Investments to track energy use and demand for each tenant.

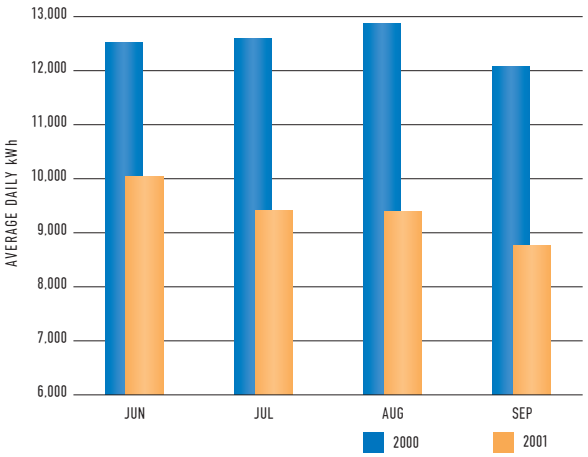
The arrival of the California energy crisis found Macanan Investments, the owner of the Comerica building, and their tenents, already concerned about rising energy costs and rolling blackouts. Through a California Energy Commission program, the building owner was able to enhance the building's lighting controls and energy information system. These measures helped reduce energy usage in 2001 by an average of 34 percent during the peak demand period compared to the previous year, while maintaining tenant comfort.

- Rising electricity costs
- Unpredictable energy supply

**PROBLEM**

At the time the California energy crisis hit its peak, the owners and tenants of the Comerica building had already begun addressing their concerns about rising energy costs and rolling blackouts. Their concerns were legitimate: In the summer of 2001, the building's electricity rate went up by 41.6 percent. The reliability of the region's electricity supply had also become a consideration, given the number of rolling blackouts occurring throughout the State. By May of 2001, the reliability issue hit home when the Comerica building suffered a rolling blackout of its own.

**Comerica Building Energy Use**




*The above graph illustrates the reduction in electricity usage (kilowatt-hours) achieved by reducing lighting levels and increasing temperature set points in the Comerica building during the peak demand months of 2000 and 2001.*

- State-of-the-art efficient lighting
- Enhanced energy information system

**SOLUTION**

Macanan Investments, the property management company that developed and owns the Comerica building, decided to participate in a California Energy Commission program that offered funding for the installation of enhanced automation technologies that would reduce the building's energy use and enable the building to quickly curtail load during an emergency shortage. They participated in the program through Global Energy Partners (GEP), an administrator of the California Energy Commission funds. Together, GEP and the building owner developed a project that added wireless controls to the building's dimmable lighting system, as well as enhanced the capabilities of their energy information system (EIS). These enhancements, in addition to providing their own benefits, enabled the building owner to increase their energy cost savings by participating in a utility rebate program.

*"With this one project, we have increased building value, as well as accomplished a desirable social objective very satisfying."*

*"Because of our new metering capability, we have greater understanding of and control over our energy costs, and are able to more effectively manage our budgets."*

John Buchanan
General Partner
Macanan Investments

*"These enhancements are saving us and our tenants money and have raised our awareness about the importance of energy management – especially in this volatile market and unpredictable political climate"*

- Lower energy demand and costs
- Ability to benefit from incentive programs
- Flexible, enhanced lighting system
- Increased building value

## BENEFITS

The building system enhancements have helped reduce energy use in 2001 by an average of 34 percent during the peak demand period (June – September) compared to the previous year. These savings can be attributed, in part, to the new EIS, which has enabled owners to closely monitor and adjust their energy usage. Because the building's utility interval meter was connected to the Internet, the owners can now, from a password-protected Web site, access energy usage (kWh) and demand (kW) data in 15-minute increments at any time. This has enabled the building owners to factor tenants' energy demand and time of use into their rental charges.

The building's new wireless lighting control devices can be activated remotely in less than a half an hour by paging signals that can be initiated from a Web site. This technology, along with the new EIS, allows the building owners to participate in demand-responsive programs that offer per-kW incentives for peak load reductions during electricity shortages. A test of this system resulted in the successful curtailment of 65kW of peak demand.

One of the building owners' goals for the project was to participate in the Pacific Gas and Electric Company's 20/20 Rebate Program, in which customers who reduced their 2000 summer peak period electricity use levels by at least 20 percent during the 2001 summer peak period received a rebate of 20 percent off their monthly electricity bill. By reducing lighting usage regularly and monitoring the associated demand reductions, the owners achieved a 20 percent reduction for four consecutive months, resulting in an incentive payment of $14,539.

### PROJECT SITE DESCRIPTION

- Location:
  San Jose, California
- Size:
  287,120 square ft$^2$
- Space Function:
  Office space
- Number of Occupants:
  700
- Building Owner:
  Macanan Investments
- Site Contact:
  Sue Cam
  Property Manager

**Energy Usage**

- Peak Demand:
  650 kW
- Curtailable Demand:
  65 kW

**Equipment Installed**

- T-8 lamps
- Dimmable ballasts
- Lighting control panels
- Internet gateway

**Project Cost**

- $358,000

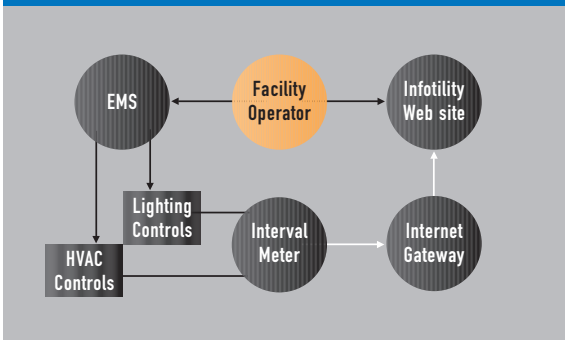
**Project Incentives**

- $78,539

# Technical Information

Macanan Investments' enhanced automation project involved connecting the building's dimmable lighting ballasts to pager-activated control devices. On each floor, the ballasts are connected via a low-voltage loop to a control panel that has three relays. Each relay corresponds to a lighting setting—the first operates the lights at 82 percent of normal output, the second at 72 percent, and the third at 62 percent. The 62 percent level was intended for use during emergency curtailment situations only, but owners found they could operate lights at this level during peak afternoon hours without disrupting occupancy comfort. During the remainder of the day, the first two settings are used and at night the lights are swept off. The lighting system now never needs to operate at 100 percent capacity and because the building has recently been retrofitted with high efficiency T-8 lamps, the lighting output remains at or near pre-retrofit levels.

**Schematic of Comerica Building System**




The light levels are programmed and the relays are activated through the building's Trimax energy management system (EMS), which had been in place prior to the project. The EMS had traditionally been used to turn on/off lights on each floor according to tenant operating hours. It is also used to control the thermostats that dictate the operation of the building's HVAC system. To achieve even greater savings during peak demand months, building operators raised thermostats via the EMS to increase the temperature of the HVAC system's chilled-water supply by six degrees.

Macanan Investments also enhanced the capabilities of their utility meter with an EIS. The meter connects to an Internet gateway, which collects usage data (from meter pulses) and sends it through the building's local area network to a fixed IP address. The energy use data is available the next day in the form of statistics, charts, and graphs from a password-protected Web site maintained by Infotility, Inc., at www.power-pact.com.

## TAKING THE NEXT STEP

Free resources are available from the California Energy Commission.

- Business Case Guidebook
- Technical Options Guidebook
- Contractor and Vendor Lists
- Technical Assistance
- Case Studies
  1. Alameda County
     HVAC Controls/
     Government Facility
  2. Hewlett-Packard Company
     HVAC and Lighting Controls/
     Office Campus
  4. Foothill-De Anza Community Colleges
     HVAC and Lighting Controls/
     College Campuses
  5. Staples, Inc.
     HVAC and Lighting Controls/
     Retail Chain
  6. Doubletree Hotel Sacramento
     HVAC and Lighting Controls/
     Hotel and Convention Center

Contact us for free materials or for further information:

- 1-866-732-5591
- enhancedautomation@xenergy.com
- www.energy.ca.gov/enhancedautomation

## Additional Resources

- California Energy Commission
  www.energy.ca.gov/peakload/index.html
- Cash for Kilowatts Web site
  www.energy.ca.gov/peakload/cash_kilowatts.html
  (also for 50–200 kW demand)
- Your local utility
  - www.sdge.com/business/drp.html
  - www.pge.com/003_save_energy/003b_bus/index.shtml
  - www.sce.com/sc3/002_save_energy/002i_load_redn/default.htm